Statistical Analysis of a Bank Efficiency During the Global Crisis –
Background for the Banks Economic Development Solutions

MIHAI ARISTOTEL UNGUREANU,
Accounting and Finance Department
Romanian American University,
1B Expozitiei Blvd., sector 1, Bucharest,
ROMANIA,
m_a_ungureanu@yahoo.com

DANIELA SERBAN,
Statistics and Econometrics Department,
Academy of Economic Studies Bucharest,
6 Piata Romana, sector 1, Bucharest,
ROMANIA,
danielaserban2002@yahoo.com www.ds_minisite.com

MIHAELA GRUIESCU,
IT, Statistics and Mathematics Department
Romanian American University,
1B Expozitiei Blvd., sector 1, Bucharest,
ROMANIA,
mgruiescu@yahoo.com

OANA ELENA DOGARU,
Statistics and Econometrics Department,
Academy of Economic Studies Bucharest,
6 Piata Romana, sector 1, Bucharest,
ROMANIA,

Abstract: - The main purpose of this paper is to examine the financial situation of ProCredit Bank on the Romanian financial-banking sector and to determine the main factors influencing and contributing to the bank’s development. The methods of research and data collection used are the quantitative methods for analyzing, strategic methods for development and databases constructed from secondary data gathered through the centralization of annual financial statements. As a result of the research, the most important influencing factors of the development of banks in the Romanian banking system have been studied and summarized and made up recommendations for the object of interest of this paper. The main goal of this paper was to analyze how efficient / inefficient and how profitable / unprofitable ProCredit Bank for a period of eight years of banking market activity, during the global financial crisis.

Key-Words: bank efficiency, quantitative research, index numbers, gross loan portfolio, liabilities to customers, financial crisis

1 Introduction

Statistical analysis of a bank efficiency during the global financial crisis on the Romanian banking market. The banking sector includes a diverse group of financial services firms, including investment banks and brokerages, diversified commercial banks, and custodial banks and asset managers. These firms are described generically as “banks” 10. The private foreign banks are increasing their influence in Romania while the Romanian owned banks have a relatively constant evolution but in the long run may lose some of their market share.
The purpose of quantitative research is to measure concepts or variables that are predetermined objectively and to examine the relationship between them numerically and statistically. This is how this paper was projected: taking a typical bank specialized in giving loans for small-medium enterprises and business, agricultural credits on the Romanian banking sector and finding out how efficient it is, seeing some results from the bank’s point of view.

The time range has eight years comprising variables describing the situation of the bank from its balance sheets and its annual income statements. Taking these data and working them with the previous mentioned and future described methods, the papers aim is to demonstrate that the bank is surviving during the financial crisis, moreover, that with the help of the appropriate tools, people and managerial decisions it will recover very fast and it will be developing in the near future.

2 Problem Formulation

Economic efficiency refers, on the other hand, at the level or degree of accomplishment by a company of the economic objectives set for a certain period of time. In case the objective was reached 100%, we can talk about maximum efficiency, and in the rest of the cases, about different partial degrees of efficiency.

Looking at the database which centralizes the balance sheets from all the eight years, it can be concluded to take three of the most important figures and analyze them each at a time (see formula 1).

\[ A = L + E \]  

(1)

This equation is the principle guiding every accountant and every analyst when starting or verifying a balance sheet. In words, total assets is equal to the sum of total liabilities and shareholder’s equity. Therefore, the result is that it should be paid great attention to these three key figures’ evolution.

This paper has used the quantitative methods of index numbers for different variables for the entire population, calculation of return rates, changes of index numbers over consecutively periods.

The return is defined by a firm’s capacity of obtaining through its activity a profit under the conditions of mobilizing the resources which possesses. Return represents an essential part in economic efficiency and constitutes a fundamental element of determining a firm’s performance value.

As efficiency indicators, with reference to a firm’s economic reliability, are defined the following:

1. Liquidity indicators or of treasury, which characterize the financial situation of a firm from its balance sheet situation with the help of liquidity ratio, which expresses the firm’s current assets margin, until the moment that appear difficulties in respecting short-term financial liabilities:

\[ \text{LiquidityRatio} = \frac{\text{CurrentAssets}}{\text{CurrentLiabilities}} = \frac{CA}{CL} \]  

(2)

2. Solvability indicators, among which it has been recalled debt ratio, which expresses an economic agent’s capacity of honoring its financial liabilities towards third parties through its own assets:

\[ \text{DebtRatio} = \frac{\text{TotalDebts}}{\text{TotalAssets}} = \frac{TL}{TA} \]  

(3)

3. Return indicators, namely:
   a. return on equity, which shows the net profit share in the shareholder’s equity
   b. return on total assets, which expresses the economic agents’ possibility of supporting an own investment effort, on the basis of the resulted gross profit, divided by the total assets:

\[ \text{Return on Total Assets} = \frac{\text{OperatingIncome}}{\text{TotalAssets}} \]  

(4)

The economic rate of return shows the efficiency of assets application and presents different values according to the national economic sectors. This one’s level must be compared with the average interest rate on the banking market, as follows:

- when the level of economic return rate in smaller than the interest rate, it means that the firm registers losses;
- when the level of the economic return rate is larger than the interest rate, it means that the form is using efficiently its available resources.
Moreover, in literature, with transposition in the Anglo-Saxon one, the economic rate of return, as economic profitability rate, is calculated in three methods:

\[ R_w = \frac{\text{Gross Profit}}{\text{Sh.Equity}} \times 100 = \frac{\text{Net Profit} + \text{Op.Expenses}}{\text{Sh.Equity}} \times 100 \quad (5) \]

\[ R_{ak} = \frac{\text{Gross Profit}}{\text{TotalAssets}} \times 100 \quad (\text{also called advanced capital return rate}) \quad (6) \]

\[ R_{o} = \frac{\text{Op.Pr.ofit}}{\text{Op.Assets}} \times 100 \quad (7) \]

The financial or profitability rate of return, also known as return on equity, expresses the ratio between the financial profit and the shareholder’s equity of the firm, and as such the simple model is:

\[ ROE = \frac{\text{Net Profit}}{\text{Sh.Equity}} \times 100 \quad (8) \]

In order to analyze these efficiency indicators, values for current assets and current liabilities were computed in Excel.

**Rate of turnover return** is calculated as a ratio between the absolute level of net profit and the total accomplished turnover, for a management period, by the relation:

\[ R = \frac{\text{Net Profit}}{\text{Turnover}} \times 100 \quad (9) \]

and it characterizes the entire activity of the firm during a financial year.

**Economic rate of return of assets** \((R_{ea})\) characterizes the efficiency of the material patrimonial elements engaged in the firm’s activity. It starts from the fact that the entire capital used by the company, in a way or another, directly or indirectly, has an important contribution in obtaining profit.

\[ R_{ea} = \frac{\text{Gross Profit}}{\text{Turnover}} \times 100 = v_a \times R_t \quad (10) \]

where \(v_a\) = assets rotation speed = \(\frac{\text{TotalAssets}}{\text{Turnover}} \times 360 \quad (11)\)

It is determined as the ratio between the absolute value of the profit, and the total patrimonial assets or as a product of the assets rotation speed and the rate of turnover return.

### 3 Problem solution

In 2003 the current ratio had the value 1.44, meaning that the bank was very efficient in paying its short-term obligations. Over the next years, until 2007, included, the values of the current ratio dropped, meaning that ProCredit Bank registered difficulties in paying its short-term liabilities, but looking closely, the values remained over 1, which means that the company managed to meet its obligations. For the last two years, 2009 and 2010, the bank increased its current ratio value up to 1.06 for both years, meaning that things are back on the right track.

As concerning the debt ratio, from 2003 up to 2007, included, it kept increasing, reaching a value of 0.93, but dropped again for the last two years, 2009 and 2010, having the value 0.9 for both of them. This means that since its beginning of activity in 2003, up to present, 2010, the company had more assets than debts, the values being under the value 1. In addition, in 2010, for instance, the proportion of the bank’s debts relative to its assets was of 0.90.

In general, return rates are determined as ratio between the economic effects and the obtained financial effects and the efforts put in order to obtain them. Return rates measure results obtained in report with the firms’ activity (commercial return) with the economic means (economic return) or financial means (financial return).

If it is to be compared the economic return rate of ProCredit Bank with the average interest rate on the banking market, according to the data given by the National Bank of Romania, in the 2011 newsletter (in 2003 the average interest rate was 18.83%, in 2004 the average interest rate was 20.27), is found that the level of the economic return rate of ProCredit Bank is lower than the level of the interest rate on the banking market, therefore in this period, the bank registered losses.

From 2005 and up to 2010, if it is compared the economic return rate of the bank in discussion with the average interest rate, according to NBR (in 2005 the average interest rate was 9.59, in 2006 was 8.43, in 2007, 7.46, in 2008, 9.46, in 2009 the average interest rate was 9.33 and in 2010, 6.66) it
can be observed the fact that the economic return rates exceed the interest rates by far, and thus, it can be concluded that ProCredit Bank has registered essential earnings for the last six years studied.

It can be observed the fact that the rate of financial return on shareholder’s equity started with negative value in its beginning year, 2003, increasing for the next years, up to the value of 7.69 in 2006, and then dropping again for the next years, until it reached again the negative, and worst value, in 2009, of -24.54, improving a little in the last year, -13.83. This means that for the first four years, the bank’s investments from the equity were efficient, but for the next four years, ProCredit Bank was not able to manage them as well, nor of maintaining them at an appropriate level.

It can be observed the fact that the rate of turnover return took values alternatively, meaning that it either increased or decreased over the years studied. Therefore it can be stated the fact that, during 2004, 2006, 2008, and 2009, ProCredit Bank had less expenses for higher net profit than the previous afferent years. In opposite, during 2005, 2007 and 2010, the rate of turnover return decreased compared to the previous afferent year, therefore, the bank registered higher expenses than income compared to the previous year, but still, acceptable given the fact that the results are larger than 1. The goal of the company is to increase the amount of profitability from one period to the next, and looking at the table, ProCredit Bank managed to do so by end of 2009.

Since its beginning of activity, ProCredit Bank registered a continual decrease in the economic rate of return of assets, until 2006, included, meaning that the bank did not manage to use its available material elements from assets efficiently. In 2007, the company registered a significantly growth, it became more efficient in using its assets in order to generate profit, but then the rate dropped again by approximately one percentage each year, reaching a final value of 7.73 in 2009. In 2010, the bank reached its peak, a final value of 9.37, meaning that it generated 9.37 times more profit according to the turnover accomplished.

At the firm’s level, are computed with the values from the database with annual balance sheets, the average economic return of assets ($\bar{R}_{ea}$) in 2004 and 2010, for a further economic development analysis:

\[
\bar{R}_{re2010} = \frac{T_{2010}}{TA_{2010}} \cdot \frac{G Pr_{2010}}{T_{2010}} = 9.37\% 
\]  \hspace{1cm} (12)

\[
\bar{R}_{re2004} = \frac{T_{2004}}{TA_{2004}} \cdot \frac{G Pr_{2004}}{T_{2004}} = 8.70\% 
\]  \hspace{1cm} (13)

\[
\bar{R}_{re2004} = \frac{T_{2010}'}{TA_{2010}} \cdot \frac{G Pr_{2004}}{T_{2004}} = 0.6095\% 
\]  \hspace{1cm} (14)

The determination of relative modifications (R) and absolute modifications (Δ) of the economic rate of return of assets from the analyzed period (the current one) comparing to the base period is realized through the use of the index numbers calculated as ratios of two averages, in which the average return in considered derived indicator influenced by the assets rotation speed ($v_a$) and the rate of turnover return ($R_t$), so that it can be written:

\[
\bar{I}_{\bar{R}_{ea}} = \frac{\bar{R}_{re2010}}{\bar{R}_{re2004}} = \frac{9.37}{8.70} = 1.0770 \text{ or } 107.70\% 
\]  \hspace{1cm} (15)

\[
\bar{I}_{\bar{R}_{ea}} = \frac{\bar{R}_{re2010}'}{\bar{R}_{re2004}'} = \frac{9.37}{0.60} = 1561.66 \text{ or } 1561.66\% 
\]  \hspace{1cm} (16)

\[
\bar{I}_{\bar{R}_{ea}} = \frac{\bar{R}_{re2004}'}{\bar{R}_{re2004}} = \frac{0.60}{8.70} = 0.0689 \text{ or } 6.89\% 
\]  \hspace{1cm} (17)

\[
\Rightarrow 1.0770 = 15.6166 \times 0.0689 
\]  \hspace{1cm} (18)

The absolute modifications (Δ) are:

\[
\Delta_{2010/2004}^{\bar{R}_{ea}} = \bar{R}_{re2010} - \bar{R}_{re2004} = 9.37 - 8.70 = 0.67\% 
\]  \hspace{1cm} (19)

\[
\Delta_{2010/2004}^{\bar{R}_{ea}'} = \bar{R}_{re2010}' - \bar{R}_{re2004}' = 9.37 - 0.60 = 8.77\% 
\]  \hspace{1cm} (20)

\[
\Rightarrow 0.67\% = 8.77\% + (\approx 8.10\%) 
\]  \hspace{1cm} (21)

It can be observed an increase of the assets return with 0.67% as an effect of the acceleration of the assets rotation speed with 8.77% and because of the decrease of turnover return with 8.10%, during the years studied.

From the previous analysis and computations, it can be concluded that the turnover increased...
significantly, which is actually a positive effect for the company, not a negative one. ProCredit Bank registered an increase of 107.70% in the average economic return on assets, meaning that the bank managed to use its material patrimonial elements engaged in its activity, efficiently and growing.

4. Conclusions

The important elements for the bank, gross loan portfolio and liabilities to customers, both increased up to 2007-2008, and then dropped hard to 2009-2010, but it can be concluded that there is notification of future increases in their values, depicted from the trend lines. The elements from the balance sheet, total assets and total liabilities, had a similar trend of evolution, meaning that they increased up to 2008-2009 and then it can be observed a slight decrease in their values, followed by future increases described by the lines, it the trends are to be pursued. The shareholder’s equity evolution is the opposite of its balance sheet’s colleagues, meaning that it alternated in values, smaller and larger, therefore it has a chaotic cyclical evolution, one year increased, the next decreased, therefore it is very hard to predict upon its future development, but trend line also shows very slow increases in it.

It can be further concluded that the most significant changes appeared in the total loans, which increase on the whole studied period of 49.76 times was due to the number of loans and their value, the increase of 435.01 times in the deposits was influenced by the number of the deposits and the value of the latter, and the so called productivity of the bank, defined by an increase of 42.16 times was influenced by the number of staff and the total value of loans given. Besides the shareholder’s equity and all of the other element that are directly or indirectly related to it, return on equity with a value under 1, and serious oscillations over the period of eight years studied, not good for the bank, and the rate economic return, defined by the ratio between the gross profit and equity, having the same evolution, all the other major elements studied in good places and having a positive evolution, giving positive effect for ProCredit Bank. The cost/income ratio is 0.85, being under 1 means that the bank is generating lower costs compared to income; capital ratio is over 9, minimum being 6, return on total assets is over 1 since a couple of years ago, the minimum being 0.70. Regarding the current ratio, although it decreased for the period studied, it always remained over 1, meaning that the bank managed to use its assets to overcome short-term liabilities; the debt ratio, on the other hand, increased, but did not exceed 1, meaning that the bank accomplished its total debts successfully. The facts for the above mentioned are improving step by step, having trends increasing, or respectively, decreasing.

In 2010, banking operations were still very strongly influenced by the financial crisis. At the same time this situation has created opportunities and ways to avoid and reduce threats for a bank that has consistently taken a rigorous approach towards risk management.

References: